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OLD PEOPLE AND NEW IDEAS:

RECEPTIVITY AND RIGIDITY

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ABSTRACT

It is generally assumed that it is difficult to induce behavioral and/or attitudinal change in older adults, especially if the target behaviors or attitudes represent important, central, or well-established patterns. An experimental study with 80 actively functioning women aged 65-74 was designed to test these assumptions with respect to food selection.* Two tasks investigated subjects' responses to nutritionally positive and negative types of (1) new information about familiar alternatives and (2) new alternatives. Results indicated that subjects correctly evaluate and integrate the new into subsequent choices. However, amount of change is affected by decision domain and positivity-negativity of alternatives.

*The research project which is the subject of this paper, by its nature, had to make use of brand-named goods and these are reported. However, The Rand Corporation and those conducting the research express no opinion on the goods or the participants' evaluations, but merely report the results of this project.

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Cognitive flexibility is a variable thought to be importantly related to assimilation of new information and new alternatives, and also thought to be age differentiated (Ruff and Korchin, 1967). Changes in behaviors and/or attitudes are regarded as difficult to induce in older adults, especially if the target behaviors or attitudes represent central and well-established patterns. But ability to modify existing repertoires would seem to be critically involved in successful adaptation to aging, particularly because the older population continuously faces significant internal physical changes as well as external environmental changes (Lawton and Nahemow, 1973). An extensive review of studies of flexibility found results to be inconclusive and inconsistent: there is no clear preponderance of evidence suggesting that older people are either more rigid or more conforming than younger individuals (Bennett and Eckman, 1973).

An experimental study of 80 actively functioning women aged 65-74 was designed to test assumptions regarding ability to modify attitudes and beliefs in the area of food selection.* The food domain was chosen for study because: (1) evaluation of new information and new alternatives is importantly related to changes in health status of older adults and changes in product availability, (2) nutritional decisions are recurrent and salient in the lives of older people, and (3) eating preferences represent long-term well-established patterns (Howell, 1974).

METHODS

All participants were Los Angeles residents living in private households and regularly shopping for food in markets. Recent SMSA census data (Glick, 1977) formed the basis for the recruiting plan, intended roughly to match on demographic selection variables such as income, education, and prior work history the modal group of older persons: white women living alone and functioning in the community. In addition, volunteers had to be able to read and respond to experimental materials.

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*This study was undertaken as part of a larger research project supported by National Science Foundation Grant No. APR75-20134. For a more complete account of the research, see Product Decision Processes Among Older Adults, T. K. Bikson and J. D. Goodchilds (final report to the National Science Foundation, published as R-2361-NSF), Santa Monica, California: The Rand Corporation, 1978.

Subjects fulfilling these criteria (mean age = 69) were recruited at sites where National Nutrition Programs for the Elderly, funded through OAA Title VII, provide low-cost meals. These programs are located primarily in small city parks, Senior Citizens' Centers, and church or club halls. Each participant was paid $5 to take part in one 1 1/2-hour group session, usually with four to six others. Sessions were conducted at the recruitment sites.

The stimulus materials consisted of two ten-item sets of 4" by 5" laminated color photographs, one of common bread products, the other of cheeses; a sample stimulus item from the cheese set is reproduced in black and white as Figure 1. Subjects were each provided with their own sets of stimulus materials and recorded their responses in individual large-print response booklets. Groups of subjects were randomly assigned to one of four experimental conditions (see Table 1), with all subjects performing both tasks. Procedures for all groups were identical except for: (1) product order, whether bread products were used for Task 1 and cheese products for Task 2 or the reverse; and (2) specific condition, whether positive or negative nutritional information accompanied the particular product items chosen for experimental manipulation.

Table 1

STUDY DESIGN

	Task 1 New information, familiar products	Task 2 New information, new products
Order 1 = Bread first		
Condition 1 (C Positive)	n = 20	
Condition 2 (J Positive)	n = 20	
Order 2 = Cheese first		
Condition 3 (F Positive)	n = 20	
Condition 4 (I Positive)	n = 20	

N = 80

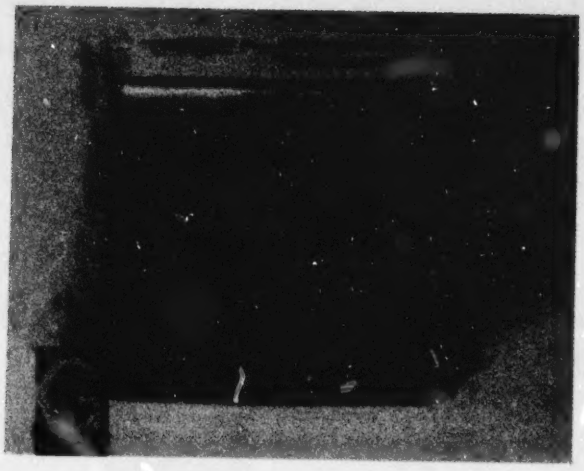


FIGURE 1

After a general introduction to the research program, subjects were given an opportunity to familiarize themselves with the stimulus cards. Participants were by and large well acquainted with the products represented and found the photographs easy to use. As the very first exercise with a product class, subjects were asked to sort the ten items in terms of extent to which they were accustomed to purchasing them. Next they ranked the ten items overall from best to worst, thereafter indicating the relative importance to them of four factors in that general evaluation ("price," "good for you," "personal preference," "actual buying habits"). Following the unconstrained ranking, subjects were asked to rerank the products twice, once strictly on the basis of their nutritional value and finally strictly in terms of liking.

At this point, when subjects were quite familiar with the product set, the first experimental task was introduced. Subjects were told that we were attempting to determine whether people have the kind of information they need in a useful form for choosing products in stores. For each of five items in the stimulus set subjects received a laminated 4" by 5" information card which stated the product's contents in terms of calories, carbohydrates, fat, and percentage of USRDA protein, riboflavin, and calcium (the predominant nutrients for the product groups). For three of the five items, the information card presented exactly the information given on the product package. For the remaining two, the information was manipulated such that one received more positive nutritional information (making it appear to be nutritionally superior to the best item in the set) and the other more negative nutritional information (making it appear to be nutritionally inferior to the worst item in the set). To avoid confounding item effects with direction of information, the pairing of item by positive or negative information was counterbalanced; thus, for instance, in Condition 3, subjects received positive information about item F and negative information about item I while in Condition 4 item F was negative and I, positive. Figure 2 provides examples of a veridical information card (item G, sliced American) and positive and negative cards for a manipulated item (item I, a store-brand cheddar). After subjects had an opportunity to study the information cards, the cards were collected and subjects were asked to rank the entire product set again from best

SLICED AMERICAN (S)

Nutrition Information

Calories	90
Carbohydrates	2 grams
Fat	7 grams

USRDA

Protein	10 %
Riboflavin	4 %
Calcium	15 %

Values per serving
U.S. recommended daily allowance

VON'S CHEDDAR (I)

Nutrition Information

Calories	70
Carbohydrates	0.5 grams
Fat	2 grams

USRDA

Protein	16 %
Riboflavin	8 %
Calcium	20 %

Values per serving
U.S. recommended daily allowance

VON'S CHEDDAR (I)

Nutrition Information

Calories	110
Carbohydrates	2.5 grams
Fat	12 grams

USRDA

Protein	3 %
Riboflavin	1 %
Calcium	2 %

Values per serving
U.S. recommended daily allowance

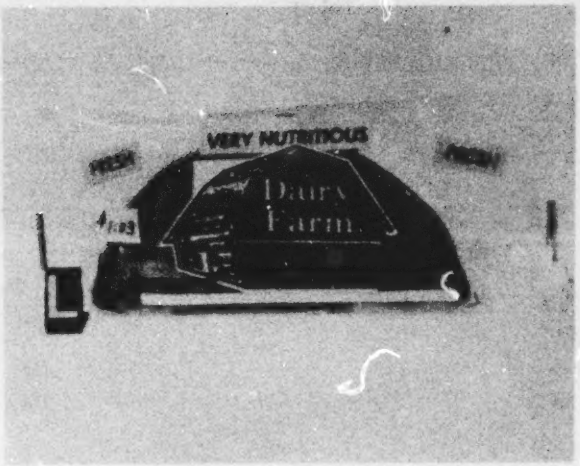
FIGURE 2

to worst. This second overall ranking served as an index of subjects' receptivity to new information about familiar alternatives.

For the second part of the experiment (Task 2), subjects shifted to the alternate product class, receiving a set of laminated color photographs for that alternate product class. Task 2 began with procedures virtually identical to those employed in Task 1. That is, subjects were given an opportunity to become familiar with the stimulus set, were asked to sort the products as to frequency of purchase, and then to rank them from best to worst overall, indicating the most relevant of four suggested criteria guiding their general evaluation. Following these procedures, the experimental manipulation for Task 2 was introduced. Subjects were told we were interested in what happens when new products come on the market and were given two "new" (actually fictitious) items with accompanying information cards of the same format and content as those supplied in Task 1. In size, price, and general appearance the new products resembled the other ten. The information cards represented one new product as having nutritional features that would make it the best choice in the array, while the other had features that would make it the worst. Again, particular items were balanced with direction of information. A sample fictitious cheese (Item L) along with its positive and negative information cards is reproduced in Figure 3. After subjects had time to study these products, the information cards were collected and subjects were asked to rank the entire 12-item set from best to worst. This post-manipulation ranking indexed subjects' receptivity to new alternatives in a choice set.

RESULTS

As their first experience with a ten-item product set prior to any experimental manipulation, subjects provided an overall best-to-worst ranking along with rankings constrained to represent nutritional value alone and simple liking alone. Regardless of the ostensible criterion, there were few pre-manipulation shifts in item order. All intercorrelations among item rankings within product class were statistically stable, high, and positive; Table 2 gives intercorrelation values among mean ranks for the three preliminary orderings plus the final post-manipulation preference rank. That subjects were capable



DAIRY FARM (L)

Nutrition Information

Calories	70
Carbohydrates	0.5 grams
Fat	2 grams

USRDA

Protein	16 %
Riboflavin	8 %
Calcium	20 %

Values per serving
U.S. recommended daily allowance

DAIRY FARM (L)

Nutrition Information

Calories	110
Carbohydrates	2.5 grams
Fat	12 grams

USRDA

Protein	3 %
Riboflavin	1 %
Calcium	2 %

Values per serving
U.S. recommended daily allowance

FIGURE 3

Table 2

INTERCORRELATIONS AMONG PRODUCT RANKINGS

	Best to Worst (pre)	Nutrition	Liking	Best to Worst (post)
Best to Worst (pre)		.81	.96	.90
Nutrition	.86		.89	.87
Liking	.99	.82		.90
Best to Worst (post)	.71	.65	.87	

NOTE: Bread correlations are in the left half matrix and cheese correlations in the right. All are significant at $p<.02$ for $N=10$.

of correctly ordering the items on a nutritional basis was demonstrated by correlating each of the pre-manipulation rankings with an "objective nutrition rank" obtained from the average of nutritional orderings provided by four nutritional gerontologists.* Across product classes association with the objective criterion was strongest for the nutritional ranking (Table 3).

Table 3

CORRELATIONS BETWEEN SUBJECT AND NUTRITIONIST RANKINGS

Ranking	Bread	Cheese
Best to Worst (pre)	.77	.33
Nutrition	.95	.74
Liking	.83	.33

Table 3 also illustrates a difference in item treatment related to product class. While all three bread item orderings are significantly

*Kendall's coefficient of concordance (W) computed among nutritional gerontologists' rankings of items for nutritional value per serving was .62 for bread ($p<.01$) and .80 for cheese ($p<.01$).

correlated with the nutritionists' ranking, it is only when subjects are specifically instructed to rank on nutrition that their ordering of the cheese items becomes similar to that of the nutritionists. Finally, when asked to indicate the criteria they used in producing the overall product evaluation, subjects reported that in best-to-worst decisions they placed most emphasis on what was good for them. It is interesting to note that although goodness reportedly took priority over personal preference and although subjects were well aware of products' nutritional values (Table 3), in fact for both product classes the overall evaluation correlated more highly with ranks on liking than on nutrition (Table 2).

Results for the first experimental task, assessing receptivity to and appropriate assimilation of new information about familiar alternatives, were startling in their consistency and clarity. Items for which subjects received nutritionally positive information were ranked better afterward; negative items were ranked worse; neutral (i.e., accurate) information items received slightly better post-ranks, and no-information items, slightly worse. In Table 4 these findings are given as difference scores, with post-manipulation ranks subtracted from pre-manipulation ranks for each item. Since the "best" item was assigned rank 1, positive scores mean that the post rank is better (i.e., lower).

Table 4

DIFFERENCE IN AVERAGE PREFERENCE RANKING - TASK 1

	INFORMATION TYPE			
	None	Neutral	Negative	Positive
Bread:	-0.74	0.61	-0.60	2.50
Cheese:	0.12	-0.39	-0.52	1.08
Total	-0.31	0.11	-0.56	1.79

In addition, the data in Table 4 call attention to an important interaction effect which was consistent with conclusions suggested by the examination of pre-manipulation rankings. When all four information types are considered for both product classes, bread ranks changed significantly more than cheese ranks. Table 5 summarizes the results of a three-way analysis of variance on difference scores (pre-rank minus post-rank) with product class, item (nested within product class), and information type as variance sources. In addition to the expected main effect for type of information ($p<.01$), it is evident that evaluations of cheese items are less modifiable in response to varied sorts of information than are evaluations of bread items ($p<.05$ for the interaction between product and information).

Table 5

ANOVA: Task 1, dependent variable = $\overline{X}$ difference pre/post, four information types, *N* of observations = 320.

Key	Source	df	F	p
A	Product	1	2.230	ns
B	Item, Product	2	<1	ns
F	Information Type	3	11.581	.01
	AF	3	3.674	.05

Finally, the analysis in Table 6 confirms another important interaction reflected in the Table 4 results. The effect of new information is partly dependent on its type, with more change in ranks occurring for positive than for negative items. Table 6 presents a four-way repeated measures analysis of variance on mean item rank which includes only items targeted as positive or negative. Product class, item (within product), information type (positive or negative), and time of ranking (pre- or post-manipulation) served as factors in this analysis. The additional information provided by this analysis is contained in the significant CD interaction term, reflecting the relative change for

Table 6

ANOVA: Task 1, dependent variable = $\bar{X}$ rank, two information types (pos, neg), *N* of observations = 320.

Key	Source	df	F	p
A	Product	1	<1	ns
B	Item, Product	2	·1.274	ns
C	Information Type	1	16.330	.01
D	Pre/Post	1	8.273	.01
	CD	1	19.092	.01
	ABC	2	7.770	.01

positive compared to negative information types. Significantly more change took place for positive than for negative information ($p<.01$). It was evidently easier to induce our subjects to reevaluate familiar alternatives favorably than to get them to think less well of them.

Shifting to the alternate product class for a second experimental task assessing receptivity to and appropriate assimilation of new alternatives, subjects produced similar responses. Examination of overall ranking data collected prior to the introduction of new products showed that subjects continue to believe their item evaluations are based primarily on what they consider is good for them; and a reranking of the post-manipulation item ordering with the new products removed yielded significant correlations with the pre-manipulation evaluation (+.99 for bread and +.96 for cheese). Stability of preferences thus characterized behavior during the second task as well; apparently the introduction of new items did not alter the perception of original alternatives.

However, it is clear that subjects attended to new products and responded appropriately to information about them. New items whose characteristics are nutritionally superior received a substantially better (lower) rank than new items whose characteristics are nutritionally inferior; mean ranks for both types of new products are given in Table 7. These differences are clarified by a three-way analysis of

Table 7

AVERAGE RANK OF NEW ITEMS: TASK 2

	Negative	Positive	Difference
Bread	8.85	4.55	4.30
Cheese	7.92	6.20	1.72

NOTE: The subjects have switched products; thus the bread group in this table consists of the subjects in Conditions 3 and 4; the cheese group here are those in Conditions 1 and 2. The range of ranks has increased from 1-10 to 1-12.

variance on the mean rank of new items; again product, item (nested within product), and information type served as independent factors. Results are summarized in Table 8.

Table 8

ANOVA: Task 2, dependent variable = $\overline{X}$ rank on new items, N of observations = 160

Key	Source	df	F	p
A	Product	1	<1	ns
B	Item, Product	2	1.706	ns
C	Information Type	1	31.876	.01
	AC	1	5.822	.05
	ABC	2	4.288	.05

The significant main effect for information type ($p<.01$) confirms, as expected on the basis of Task 1 results, that type of information strongly influences evaluative responses to new alternatives. Further, as the AC interaction term indicates, product class affects receptivity; the difference between ranks of new positive and new negative items is significantly greater for the product class bread than for the product class cheese ($p<.05$). Finally, in relation to the entire 12-item set, subjects in both product class groupings showed themselves capable of accurate assimilation; superior new items were ranked in the better half of each set and negative items, among the worse.

DISCUSSION

This study undertook to examine cognitive flexibility among older adults in terms of receptivity to new information and new alternatives in a behavioral domain (food choices) characterized by well-established patterns. That evaluation of items in the stimulus sets for this research could be so characterized was demonstrated by highly stable ranking patterns under different instructional sets. Examination of pre-manipulation orderings revealed, not surprisingly, that subjects' evaluations of products are strongly influenced by personal liking. While subjects were not especially good at reporting what criteria had been important to them after a ranking task, they were nevertheless able correctly to employ an ordering criterion such as nutritional value when explicitly instructed to do so.

Having verified both stability of patterns and capability of change in evaluation of food products, the study determined by means of two experimental tasks that older adults will attend to new information about familiar alternatives as well as to new alternatives, and will correctly integrate the new into subsequent choices. In short, for the range of behaviors represented by the study, results strongly suggest receptivity rather than rigidity. These conclusions are, however, qualified in two important respects. First, information was more readily incorporated into preference rankings for one of the two item classes employed; this finding is consistent with earlier work employing the same stimulus materials (Bikson and Goodchilds, 1978) and indicates that decision

domain is itself a significant factor in cognitive processes. Second, differential receptivity of subjects to positive versus negative alternatives was demonstrated in relation to new information about familiar items, a finding consistent with previous research (e.g., Wetherick, 1966) suggesting that older adults do not consistently incorporate negative information in problem-solving or decisionmaking. However, we do not believe the results are attributable to cognitive difficulties in integrating negative information with other information for decisionmaking purposes since the effect was obtained only for familiar and not for new negatively characterized items, and since even with familiar items the negative information did influence choices in the appropriate direction. Rather, it would seem that relative inflexibility in response to negative information is more properly attributable to difficulties in modifying beliefs about familiar alternatives--perhaps long a part of the established behavior repertoire--in an unfavorable direction. To the extent that the food habits of older women have served them well, it is hard to argue that such subareas of relative inflexibility are necessarily nonadaptive.

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